

NASA's Return On Investment Report

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This bi-monthly newsletter of accomplishments, progress, and happenings in NASA's commercial crew and cargo programs is distributed by the Commercial Spaceflight Development Division at NASA Headquarters.

COMMERCIAL CREW INTEGRATED CAPABILITY PARTNERS ANNOUNCED

On Aug. 3, NASA announced new funded Space Act Agreements (SAAs) with Sierra Nevada Corporation (SNC), Space Exploration Technologies (SpaceX) and The Boeing Company to design and develop the next generation of U.S. human spaceflight systems, enabling launches of humans from U.S. soil within the next five years. Known as the Commercial Crew Integrated Capability (CCiCap), these new agreements are intended to lead ultimately to the availability of low Earth orbit human space transportation services for government and commercial customers. The agreements include a base period that runs through May 2014, during which NASA's partners will mature integrated systems designs and perform hardware tests. They also include optional milestones culminating in crewed demonstration flights.



Dream Chaser and Atlas V. Image credit: SNC



Dragon spacecraft and Falcon 9. Photo credit: SpaceX



CST-100 capsule and Atlas V. Image credit: Boeing

Under SNC's agreement, worth \$212.5 million if all nine base-period milestones are accomplished, the company will mature the design of their Dream Chaser lifting body spacecraft, which will be launched on a United Launch Alliance (ULA) Atlas V rocket. Notable milestones include further flight testing of the Dream Chaser engineering test article, two integrated system safety analyses, wind tunnel testing and propulsion systems testing.

SpaceX's fourteen base-period milestones are valued at \$440 million and will advance the design of a crewed version of its Dragon capsule and Falcon 9 rocket. The company's CCiCap highlights include pad and in-flight abort flight tests, primary structure qualification and an integrated system critical design review.

Boeing's agreement includes \$460 million for nineteen base-period milestones, which will mature the design of their CST-100 capsule to be launched on a ULA Atlas V rocket. Among these milestones are wind tunnel testing, a production design review,

propulsion systems testing and a simulated demonstration with crew. Boeing also will complete an integrated system critical design review during CCIcap.

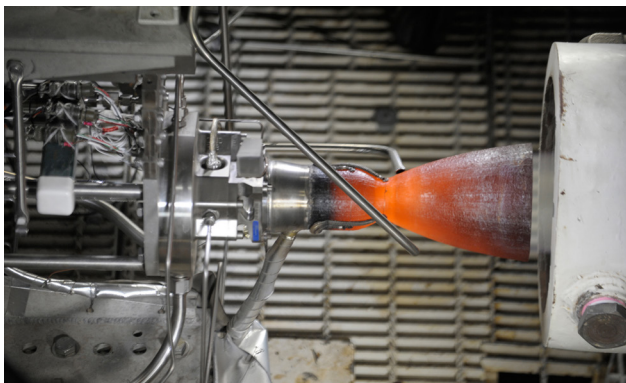
Each CCIcap SAA can be found at: <http://go.nasa.gov/nasaccicap>

COMMERCIAL CREW DEVELOPMENT 2 (CCDev2) PHASE NEAR SUCCESSFUL COMPLETION

Sixteen months ago, NASA signed the second round of Commercial Crew Development (CCDev2) Space Act Agreements with industry partners to advance multiple commercial crew space transportation system concepts and elements. The vast majority of the 62 performance milestones now have been completed, with only four more remaining. All CCDev2 milestones for the SAAs with SpaceX, ULA, ATK and Excalibur Almaz, Inc. have been successfully concluded.



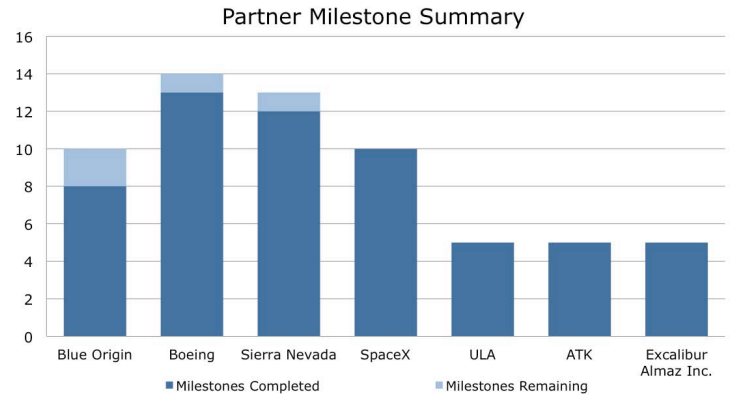
SpaceX crew accommodation trial. Photo credit: SpaceX



Boeing's OMAC engine hot fire test. Photo credit: Boeing



Blue Origin pusher escape motor ground firing.
Photo credit: Blue Origin



A summary schedule showing all completed and planned CCDev2 milestones can be found at: <http://www.nasa.gov/commercial/>

Recently, SpaceX completed their final milestone, a second crew accommodation trial. During this review, several NASA engineers and veteran astronauts evaluated a prototype crewed Dragon spacecraft to assess operational tasks and gather data to improve crew and passenger experiences. Also, Boeing recently completed hot fire testing of the orbital maneuvering and attitude control (OMAC) engines for its CST-100, which demonstrated successful performance of the thruster design at vacuum conditions.

SNC recently conducted a captive carry test of the Dream Chaser to evaluate compatibility with the carrier helicopter in preparation for future approach and landing tests. SNC also completed testing of the nose landing gear for their flight test vehicle. Blue Origin completed a ground fire test of their pusher escape rocket motor and thrust vector control system.

SNC, Blue Origin and Boeing plan to complete their CCDev2 agreements by the end of 2012. Each of these agreements has critical risk reduction milestones remaining, which will further mature their crew transportation system development. Blue Origin will conduct a pusher escape pad test to simulate an escape from a booster on the launch pad, and they will complete a full throttle test on their full-scale thrust chamber assembly. SNC's remaining milestone is an approach and landing free flight test of the Dream Chaser engineering test article. Boeing will complete a ground systems software preliminary design review.



Sierra Nevada captive carry test. Photo credit: SNC

ORBITAL PROGRESSING TOWARD ANTARES TEST FLIGHT AND COTS DEMONSTRATION FLIGHT TO INTERNATIONAL SPACE STATION

Orbital Sciences Corporation continues to make progress in readying the Antares launch vehicle, Cygnus spacecraft and ground infrastructure for two planned flights in the next several months: an Antares test launch followed by a Commercial Orbital Transportation Services (COTS) demonstration mission to the International Space Station.

The schedule for Orbital's testing and flights begins with the final integration and checkout of the Mid-Atlantic Regional Spaceport (MARS) launch pad at Wallops Flight Facility on Wallops Island, Va., currently planned by the end of August. Following turnover of the launch pad, Orbital will proceed into a series of wet dress rehearsal tests and ultimately a hot fire test of the first stage Antares vehicle on the launch pad. These tests are projected for completion in September.



Antares pathfinder on the Mid-Atlantic Regional Spaceport (MARS) pad.

Photo credit: Orbital Sciences Corporation

All major vehicle hardware assemblies for the first Antares test flight, including a Cygnus spacecraft mass simulator, are on site at Wallops. The fairing for the test flight is currently scheduled for delivery to Wallops by the end of August. Assuming completion of the MARS launch pad activation and a successful hot fire test, the Antares test flight is currently scheduled for October.

Orbital also is making progress on the upcoming COTS demonstration mission to the space station, which currently has a projected launch in December. The Cygnus spacecraft is nearing completion and all major Antares vehicle elements are either at Wallops or at Orbital's facility in Chandler, Ariz. The second of two Antares AJ-26 engines is at NASA's Stennis Space Center in Bay St. Louis, Miss., and a test firing occurred successfully on August 16th.

NASA ANNOUNCES PLANS FOR COMMERCIAL CREW CERTIFICATION PRODUCTS CONTRACT

NASA recently announced plans to issue a Request for Proposal (RFP) for Commercial Crew's Certification Products Contract (CPC). CPC is the first of two phases for Commercial Crew's certification activities.

The CPC competition is expected to result in multiple awards for the purchase of early lifecycle certification products related to an end-to-end crew transportation system for missions to the International Space Station. Contract deliverables include Alternate Standards, Hazard Reports, a Verification and Validation Plan, and a Certification Plan.

The release date of the CPC RFP is planned for mid-September with awards targeted for February 2013.

For more information on any of the articles in this report, contact Joshua Buck or Trent Perrotto in NASA's Public Affairs Office at 202-358-1100. To review NASA's other commercial space accomplishments, visit:

<http://www.nasa.gov/commercial/>